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SCIENCE.

FRIDAY, APRIL 17, 1885.

COMMENT AND CRITICISM.

THE PUBLICATION of Prof. A. Graham Bell's final memoir upon the formation of a deaf variety of the human race shows the extent and thoroughness of his investigation, which has already led to practical results in shaping, in certain states, the public economy in regard to deaf-mutes (*Science*, v. 207). To meet the claims of our readers, we briefly recapitulate Professor Bell's course of argument. He shows, 1°, that there is a marked grouping of deaf-mutes into families, certain surnames recurring frequently, and that the proportion and number of congenitally deaf mutes has increased in America, therefore the cause is probably an increasing hereditary tendency; 2°, that, of the deaf-mutes who marry at the present time, not less than eighty per cent marry deaf-mutes, while, of those who married during the early half of the present century, the proportion who married deaf-mutes was much smaller; 3°, that children having deaf-mute relatives are more likely to be congenitally deaf-mute than the children of the people at large (to illustrate this fact, he gives detailed accounts of several families); 4°, that the indications derived from the study of the actual census-tables are, that the congenital deaf-mutes of the country are increasing at a greater rate than the population at large, and the deaf-mute children of deaf-mutes at a greater rate than the congenital deaf-mute population; 5°, that the intermarriage of deaf-mutes is mainly fostered by bringing the deaf-mutes together in institutions, and isolating them thereby, and by teaching them a language (of signs) the people at large do not use.

Professor Bell, therefore, regards the philanthropic efforts which have been made to ame-

liorate the condition of deaf-mutes as the direct cause of an increase in the number of these unfortunates. A good purpose is the father of an evil result. What a strange antithesis! How striking the important lesson it teaches us of the efficiency of the scientific spirit as a guide in practical affairs,—that spirit which obtains thorough knowledge, and follows out to the end the analysis of cause and effect! The scientific mind, in its best form, is equipped to discover, to derive from new premises their legitimate conclusion: it is reason at its maximum power. This is not the first time that the inventor of the telephone has proved the efficiency of a mind of this quality in achieving results of immediate and far-reaching importance, and added new dignity to science in the estimation not only of thoughtful persons, but also of practical-minded Americans.

THE DOCTRINE that the bodies of all the higher plants and animals are aggregations of myriads of minute, and in many respects independent, cells, had its origin some fifty years ago. Though now universally accepted by biologists as an essentially correct generalization, it has not yet become one of those scientific facts widely known to, and accepted by, the general educated public. To the 'average man,' the proposition that his body is a collection of thousands of microscopic masses of living matter, each of which lives its life in more or less harmony with the rest, but to a great extent without any reference to them, is an astounding one. He finds it nearly impossible to realize that in certain respects he is rather a nation than an individual; that his bodily life is the algebraical sum of the living and doing of hundreds of thousands of cells, much as the vitality and activity of a nation is the resultant of the actions of all its inhabitants. His physical life is to him an entity. In consequence, there is nothing which the physiolo-

gist finds it harder to make comprehensible to the laity, than that a frog, as a complete animal, may be killed by destruction of its nervous system, yet most of its organs remain alive for hours; also the fact that it is not only possible in many cases to isolate particular organs or cells, keeping them alive for study after killing the rest of the plant or animal, but that this is even necessary, if the working of any complex organism is to be really understood. This popular ignorance, like all ignorance, has evil results. Much of the disquietude which many persons now feel in regard to physiological experiment is due to the fact that they do not realize that experiments on living hearts or muscles are usually carried out on animals which, as a whole, have previously been killed by destruction of the brain.

THE REMARKABLE operation so successfully performed by Dr. William Fluhner of New York, involving no less a difficulty than the probing of the brain-substance itself in search of an embedded bullet, and the extraction of the missile through a counter-opening in the skull opposite the point of entrance, marks a new step in surgery which is startling in its suggestiveness. It could hardly have been anticipated that so complete a recovery would follow an operation of such difficulty and danger, involving as it did the retention in the brain, for a prolonged period of time, of a rubber drainage-tube passing completely through the head from the forehead to the back of the skull. The recovery is more remarkable on account of the additional complication of a severed artery which could not be tied, and which threatened speedy death from hemorrhage. The case illustrates the value of antiseptic or aseptic treatment, as well as the possibility of removing much brain-tissue in man, with thus far relatively little damage, which had already been demonstrated for other animals, notably for the dog. This had, however, been fairly well established for man in some cases of injury, where the surgeon had hesitated to interfere very actively. An ac-

count of this remarkable case will be found on another page. While its success would appear to justify a similar procedure under like circumstances, it is still far from certain that the next case would prove so easy of operation.

LETTERS TO THE EDITOR.

Mental capacity of an infant.

APROPOS of 'Acquisition in infants,' I am tempted to state the results of an experiment I made, not long since, to test the mental capacity of Helen R. H., on the day she was fifteen months old, walking actively, but speaking only half a dozen words.

With pencil and paper, and several reliable witnesses present, I sat down, and without making any signs, or allowing signs made by others, the mother and I began to give the child a series of commands, the execution of which involved an accurate knowledge of various verbs, nouns, and pronouns. The commands were given distinctly, very seldom repeated, and were obeyed very promptly, without any questioning or explanation whatever. In one hour's time sixty-one commands were obeyed by the child with absolute precision, which showed a remembrance and correct understanding of thirty-one verbs and fifty-one nouns and pronouns. The commands given were such as the following: 'Kiss your hand,' 'Make a bow,' 'Knock on the door,' 'Blow out the candle,' 'Put the basket on the pail,' 'Put the pan in the pail,' 'Bring the bell, ball, orange,' etc. The words used were such as the child had acquired a knowledge of by observation chiefly; for not one-fourth of them had ever been taught her. I will add, that, while the child is possessed of wholesome brightness and intelligence, she has never been thought precocious.

W. T. H.

Nutritive value of cellulose.

In giving an account of some recent experiments upon the digestibility of cellulose by herbivorous animals (*Science*, No. 100, p. 11), the writer took occasion to point out that the conclusions which certain writers had drawn from these experiments, regarding the nutritive value of digestible cellulose, were not sustained by the facts.

The last number of the *Zeitschrift für biologie* (xxi. 67) contains a paper by W. v. Kniერიem upon the utilization of cellulose in the animal organism, in which are detailed experiments upon the digestibility of cellulose, and upon its nutritive effect, which strikingly corroborate the belief above mentioned.

The method of experiment adopted is a novel one. It consisted in feeding the animals (usually rabbits) with food containing no cellulose; the necessary bulk being supplied by horn-shavings, which were usually eaten freely, and which, as special experiments showed, were entirely unacted upon in the alimentary canal. After all the cellulose of the previous feeding had thus been removed from the animal, either a fodder containing a known amount of cellulose, or some more or less pure form of cellulose itself, was introduced into the ration. The solid excrements were collected and analyzed in the usual way, and, by means of a return to the original cellulose-free ration, all the indigestible cellulose was finally eliminated from the body.